Fire Support Munitions Modernization

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In October 2001, during the Army's program executive office (PEO) reorganization, the Assistant Secretary of the Army for Acquisition, Logistics and Technology established the Project Management (PM) Office for Combat Ammunition Systems (CAS) Indirect Fire. PM CAS is part of PEO Ammunition (Ammo), which is DOD's Single Manager for Conventional Ammunition.

PM CAS' core business is life-cycle management of gun-launched indirect fire munitions, mortar weapons and mortar fire control systems. PM CAS' products include related fuzes, fuze setters, propellants, explosive fills, software, hardware and electronics. PM CAS' vision is to deliver conventional and leap-ahead munitions combat power to warfighters, giving them the materiel edge over our Nation's real and potential adversaries. This article introduces PM CAS and its business initiatives, and presents selected elements of its fire support munitions modernization strategy.

The M109A6 Paladin 155mm Self-Propelled Howitzer provides the primary indirect fire support for heavy divisions and highly mobile armored cavalry regiments. Thanks to PM CAS' combat developers, precision-strike munitions like the Excalibur are extending the range, accuracy, lethality and versatility of 155mm artillery projectiles. (U.S. Army photo by SGT Jack Morse, 982nd Signal Co.)

Munitions Modernization Strategy

Indirect fire support must transform with the Army. It must achieve a proper balance of precision, point-target-killing munitions — fired from indirect fire platforms — and more accurate suppressive area-fire munitions that better enable the maneuver commander's direct-fire platforms to engage with dominant force at key decision points. PM CAS' munitions enable and enhance each of the Army's generalized transformation attributes for enhanced agility, lethality, versatility, survivability, deployability, responsiveness and sustainability for evolutionary fire support munitions — from ballistic to conventional, to precise and automated.

Following the Army's Indirect Fires Strategy, PM CAS' objective is to contribute to Army transformation success by leveraging technology to provide destructive, suppressive and protective effects, while also minimizing collateral damage. To meet its objective, PM CAS is helping combat developers determine where to invest the Nation's treasure to deliver the most cost-effective fire support systems. PM CAS' approach is to follow national and Army guidance, participate in analyses, study concepts and conduct experiments. In addition, PM CAS will collect data from and make observations about recent operations and study relevant trends in threat; rules of engagement (ROE); doctrine; tactics, techniques and procedures (TTP); and technology. This approach has revealed existing fire support capability gaps and anticipated future needs.

Findings from observations and studies have affirmed that fire support transformation is characterized primarily by improvements in precision, accuracy, range, lethality and robustness. It is also characterized by increases in responsiveness, mobility, sustainability, safety and reliability. Improvements in these attributes are necessary to better address the conventional and asymmetric threats U.S. forces are likely to encounter today and tomorrow. Therefore, PM CAS and combat developers have shaped the indirect fire support modernization strategy with these needs in mind. PM CAS' highest priority development projects address these needs. They are listed below in priority order for the two battlefield operating systems (BOS) they support.

In response to the Army Chief of Staff's call for accelerating technology development to support today's forces, PM CAS is searching for capabilities and technologies that can be fielded in 24-36 months. Prime candidates are PGMM, ACAAP and integration of Excalibur into the Paladin Self-Propelled Howitzer.

Precision Strike (Field Artillery)

- The *Excalibur* is an extended-range, precision-guided 155mm artillery projectile that reduces collateral damage and enables ground-based urban fire support. Excalibur also serves as a versatile cargo carrier for various submunitions.
- The *Course-Correcting Fuze (CCF)* is a technology that provides near-precision performance to conventional artillery, enabling more effective area fires, improves operational efficiency and potentially reduces the Class V logistics burden.
- The *Advanced Cannon Artillery Ammunition Program (ACAAP)* is an extended-range, ballistically matched family of conventional artillery projectiles that will increase range and add infrared illumination and multi-spectral smoke to the Army's arsenal. Pre-formed fragmenting warheads will potentially increase lethality against selected soft targets.
- The *Sensor-Fuzed Munitions (SFMs)* will provide artillerymen a highly effective and affordable tank-killing capability, whose value was undeniably proven during *Operation Iraqi Freedom (OIF)*.

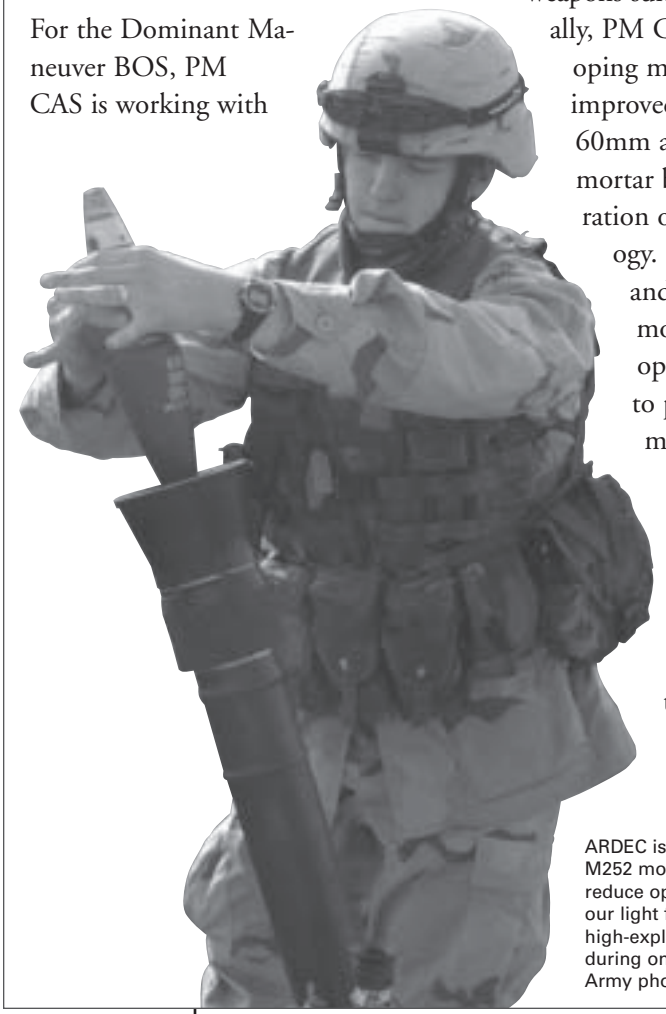
Dominant Maneuver (Organic Fire Support)

- The *Precision-Guided Mortar Munition (PGMM)* is a laser-guided 120mm mortar munition that provides the maneuver commander the ability to neutralize or destroy entrenched enemy combatants or lightly armored vehicles with indirect fire, while also limiting collateral damage.
- The *Mortar Fire Control System (MFCS)* will connect mortars to the fires network, improve precision and usher in a new era in mortar solution computing. In operational tests, the MFCS has dramatically reduced the dispersion of rounds at maximum range.
- The *120mm Extended-Range, Cargo-Carrying Mortar* will improve lethality and extend the range of organic fire support available to maneuver commanders.

PM CAS is also developing and procuring many other innovative products. For the Precision Strike BOS, PM CAS has developed and is producing Electronic Self-Destruct

Fuzes for both 105mm and 155mm cannon-fired Dual-Purpose Improved Conventional Munition (DPICM) and guided-rocket applications, such as the Guided Multiple-Launched Rocket System. By nearly eliminating hazardous duds with this technology, PM CAS will help save friendly and noncombatant lives. Currently being fielded, the Multi-Option Fuze for Artillery (MOFA) will help reduce operational and logistics burdens by replacing five other fuzes. Also in fielding, the Modular Artillery Charge System (MACS) will increase range, enable autoloading and handling, reduce gun tube wear and reduce long-term training and operating costs. Finally, the 155mm M864 DPICM Recapitalization program will employ self-destruct fuze technology to increase the lethality, reliability and safety of our Stryker forces.

For the Dominant Maneuver BOS, PM CAS is working with the U.S. Army Armament Research, Development and Engineering Center to develop the Lightweight 81mm mortar to improve unit mobility and lessen operational burdens on our light forces. A concurrent effort is underway to reduce the weight of the 120mm mortar base plate issued to Stryker forces serving in *OIF*. The Arms Room Concept (ARC) is now included in the Army Modularity Initiative for heavy and light forces. The ARC will greatly increase light forces' organic lethality and flexibility by adding 120mm mortars to their weapons suite. Additionally, PM CAS is developing much-improved lethality for 60mm and 81mm mortar bombs through exploration of embedded ball technology. Finally, for both artillery and mortars, PM CAS is monitoring combat developer requirement processes to prepare for nonlethal munitions development.



ARDEC is developing the lightweight 81mm M252 mortar to improve unit mobility and reduce operational and logistics burdens on our light forces. Here, a Soldier places a high-explosive round in the mortar tube during ongoing operations in Iraq. (U.S. Army photo by SFC Alexander Ruckers.)

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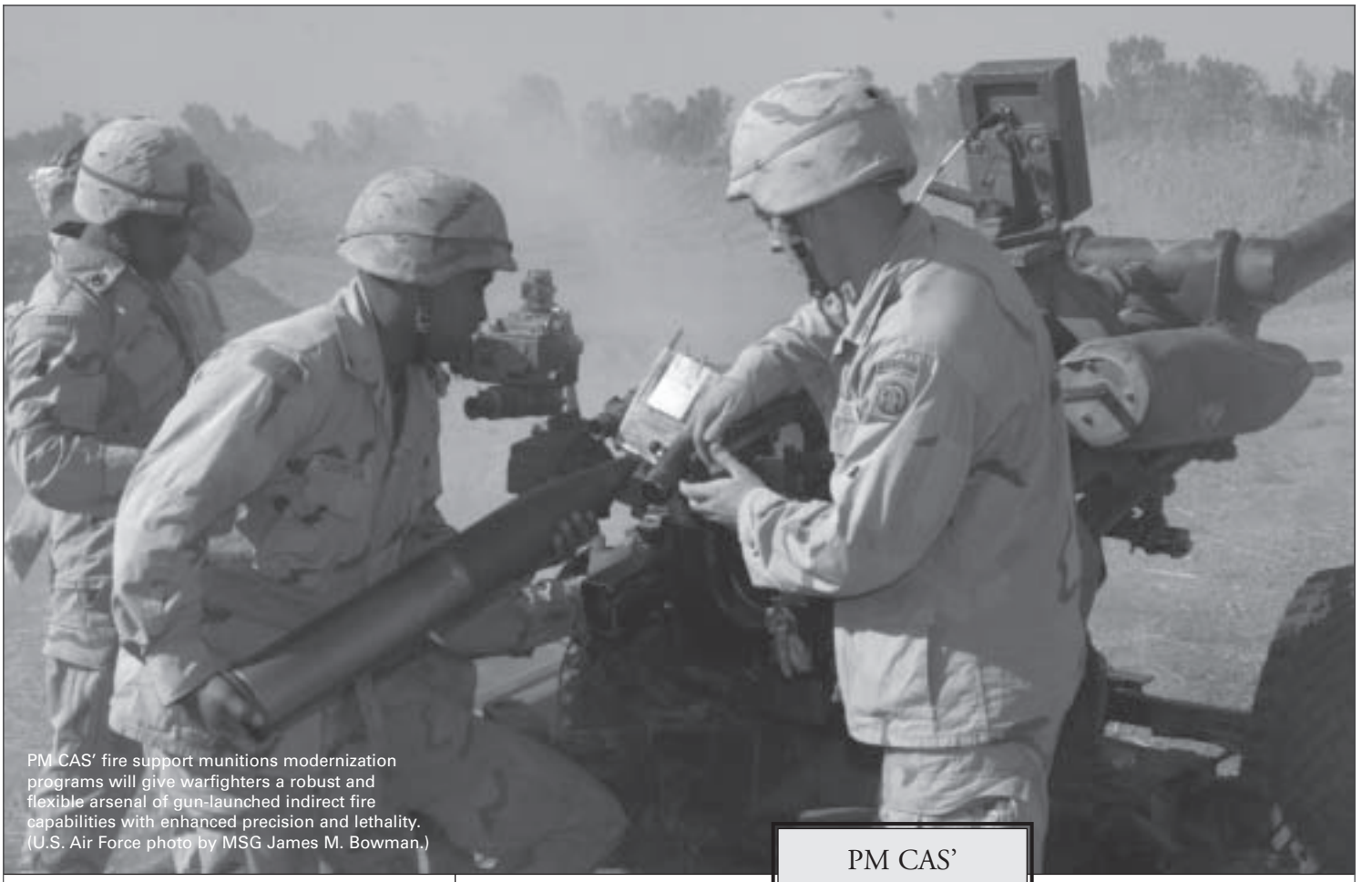
These programs will give warfighters a robust and flexible suite of gun-launched indirect fire capabilities that will increase the depth and breadth of the gun-launched indirect fire munitions suite and the complementary nature of the precision and area fire weapons that provide scaled precision capabilities to the Future Force.

Other Initiatives

In addition to the major projects already mentioned, PM CAS has other initiatives aimed at speeding capabilities to the field and at improving its business practices. First, in response to the Army Chief of Staff's call for accelerating technology development to support today's forces, PM CAS is searching for capabilities and technologies that can be fielded in 24-36 months. Prime candidates are PGMM, ACAAP and integration of Excalibur into the Paladin Self-Propelled Howitzer. Others are the Electronic Time Fuze with Course Correction, the Guidance Integrated Fuze, the ARC, the Lightweight 81mm mortar and nonlethal submunitions. Second, PM CAS is reaching out to warfighters through the "PEO Ammo Road Show," during which it will inform deploying operational units about the most recently fielded and near-term future product developments. Third, the PM office is working with its proponents and combat developers — including the U.S. Marine Corps — to develop and execute a comprehensive fires-and-effects modernization strategy.

PM CAS is also encouraging industry and government to pursue those technologies and innovations that enable or support development efforts. Among the most critical performance-



PM CAS' fire support munitions modernization programs will give warfighters a robust and flexible arsenal of gun-launched indirect fire capabilities with enhanced precision and lethality. (U.S. Air Force photo by MSG James M. Bowman.)

enhancing technologies are thermal and reserve batteries, deeply integrated and miniaturized guidance modules, seekers/sensors and sensor algorithms. Also needed are new global positioning system (GPS) codes, next-generation GPS Selective Availability Anti-spoofing Module microelectricalmechanical systems fuzing, telemetry and data links, rocket-assist and ramjet technology, digital fire control, improved target-locating devices and greater network bandwidth and efficiency. Three needed chemical technology initiatives are insensitive and safer energetic materials, composites for lighter weight components and nonlethal compounds.

To help improve asset tracking and surveillance, industry should invest in automation such as radio frequency identification, novel ammunition marking, automated inventory control, accurate ammunition condition indicators and comprehensive stockpile decision support tools. Additionally, improvements in friendly vehicle locating devices, used in conjunction with the digital network, may improve identification of friend or foe and help improve munition accuracy.

PM CAS continually executes product safety improvement initiatives such as the 120mm mortar breech cap modification; the electronic self-destruct fuze development for artillery submunitions; and the pyrotechnic, explosive and propellants (PEP) improvement program to improve the effectiveness, safety, shelf life and environmental compliance of selected energetic compounds. PM CAS is also spearheading PEO Ammo's campaign to reduce munitions sensitivity. Topping the list is the Mortar Insensitive Munitions Program, which will make the 60mm, 81mm and 120mm families of munitions less sensitive to unplanned stimuli, thereby decreasing the risk of injury or death to warfighters and damage or loss of equipment.

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In the business arena, PM CAS is conducting a study to determine when to employ horizontal contract integration (breakouts) or systems contracting. The trend is toward more systems

PM CAS initiatives — such as the 120mm mortar breech cap modification, electronic self-destruct fuze development for artillery submunitions and the pyrotechnic explosive and propellants improvement program — will improve effectiveness, safety and shelf life of selected energetic compounds. (U.S. Air Force photo by SSG Aaron Allmon II.)

contracting, but it is critical to know when either of the two primary acquisition strategies, or a hybrid scheme, is more appropriate. The study's decision templates should help. PM CAS is also improving the way it manages the stockpile through development of a database interface program called the Combat Ammunition Plan. Finally, PM CAS is exploring the value of supplementing its decision-making and problem-solving processes with expert systems analysis.

PM CAS is at the forefront of indirect fire support modernization and transformation. Its fire support munitions modernization strategy is primarily characterized by improvements in precision, accuracy, range, lethality and robustness. PM CAS is ensuring these attributes through its key transformation products: Excalibur, PGMM, CCF, MFCS, ACAAP and SFMs. PM CAS is executing many other important initiatives that address strategic planning, business practices, decision making, and problem solving to ensure that it is investing in the most effective capabilities.

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Notwithstanding, PM CAS is executing a forward-looking, but realistic and practical, fire support munitions modernization strategy that will remain flexible to adapt to the ever-changing fiscal, strategic and operational requirements environments.

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